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Naval Health Research Center Awarded First Grant to Examine Gender in Military Sexual Assault

Story by Anna Hancock, Naval Health Research Center Public Affairs



Capt. Jacqueline Rychnovsky, Naval Health Research Center's commanding officer and the principle investigator of NHRC's new study on gender in military sexual assault discusses the stigma surrounding sexual assault against men with associate investigators Stephanie McWhorter (left) and Dr. Cynthia Thomsen (right) at NHRC headquarters San Diego June 3. This is the first study spearheaded by the Consortium on the Health and Readiness of Servicewomen (CHARS) and the first study by the Navy examining the differences in the assaults that male and female service members experience, focusing on circumstances where the male service member is the victim. (U.S. Navy Photo by Anna Hancock)

SAN DIEGO – A research team from Naval Health Research Center (NHRC) was awarded a grant to examine the gender differences in experiences of military sexual assault victimization, June 23.

This project marks one of the first tri-service efforts to create a scientific knowledge base for the sexual assault experiences of men in the military. Led by NHRC's Consortium on the Health and Readiness of Servicewomen (CHARS) and funded by the Tri-Service Nursing Research Program (TSNRP), it also marks the first project led by the CHARS initiative and first grant awarded to NHRC from TSNRP. Most importantly, it marks the beginning of what the team hopes will be an informative study.

"Experts in the field, in both the military and civilian populations, designed interventions, training, and medical care based on the scenario that the perpetrator was a male and the victim was a female," explained Dr. Cynthia Thomsen, a research psychologist and associate investigator for the project. "However, the little information available suggests there are probably some very important differences between what's happening to male and female victims."

The problem, the team agrees, is that significant research hasn't been done on the role gender plays in victimization. The team views this as an opportunity to expand the knowledge base.

"We're interested in the differences

(continued on page 5)

NMRC Commanding Officer's Message

There is a remarkable amount of excellent work taking place across the Navy Medical Research and Development Enterprise. I have grown accustomed to seeing references to the work showing up in the popular press, such as this week's references to the Wounded Warrior Recovery Project (WWRP) at Naval Health Research Center (NMRC).

The WWRP is an important study designed to discover the long-term effects of combat injury on the quality of life of wounded service members and it has generated appropriate, significant interest in the popular press. Other work is sometimes less visible. For instance, I received an e-mail this week extolling the work of NMRC's Biological Defense Research Directorate in supporting the DoD's Critical Reagent Program (CRP). The outbreak of Ebola virus in West Africa has become the worst such outbreak in history and the CRP has been contributing diagnostic assays and reagents to the World Health Organization and the Ministries of Health of Liberia and Sierra Leone.

Dr. Joan Gebhardt and her staff have regularly responded to frequent and short notice requests to produce and conformance test the CRP assays prior to distribution. As the epidemic expanded this week, there was another request for 2,000 assays for shipment over the 4th of July weekend and Dr. Gebhardt's crew came through again.

This was another fine lesson for me. As I celebrate the public recognition of important work like the WWRP, I also need to recognize the fantastic work that our scientists and technologists are doing behind the scenes in so many areas that don't necessarily make the newspapers.



NMRC Commanding Officer sends,
John. W. Sanders III, CAPT, MC, USN

NAMRU-3 Commanding Officer's Message



I was truly honored on June 19th to become the 29th Commanding Officer of NAMRU-3 Cairo. Twenty-eight prior Commanding Officers' portrait photographs, in two long rows within the command suite, provide an inspiring daily reminder of this command's long and illustrious heritage here in Egypt. I was blessed with a wonderful welcome from NAMRU-3 staff and an exceptional turnover from my predecessor, Capt. Buhari "Tony" Oyofo. I am doubly blessed to have the continued superb assistance of outgoing Executive Officer Capt. Fred Landro, pending the happily-anticipated arrival of incoming Executive Officer Capt. Patrick Blair.

The week following the change of command NAMRU-3 welcomed a distinguished delegation from CDC Atlanta, headed by Capt. Jordan Tappero, USPHS, Director of CDC's Division of Global Health Protection. He and colleagues joined us for two days of collaborative program review and strategic discussion focusing on our joint opportunities in research and public health in Egypt and the region in support of Global Health Security.

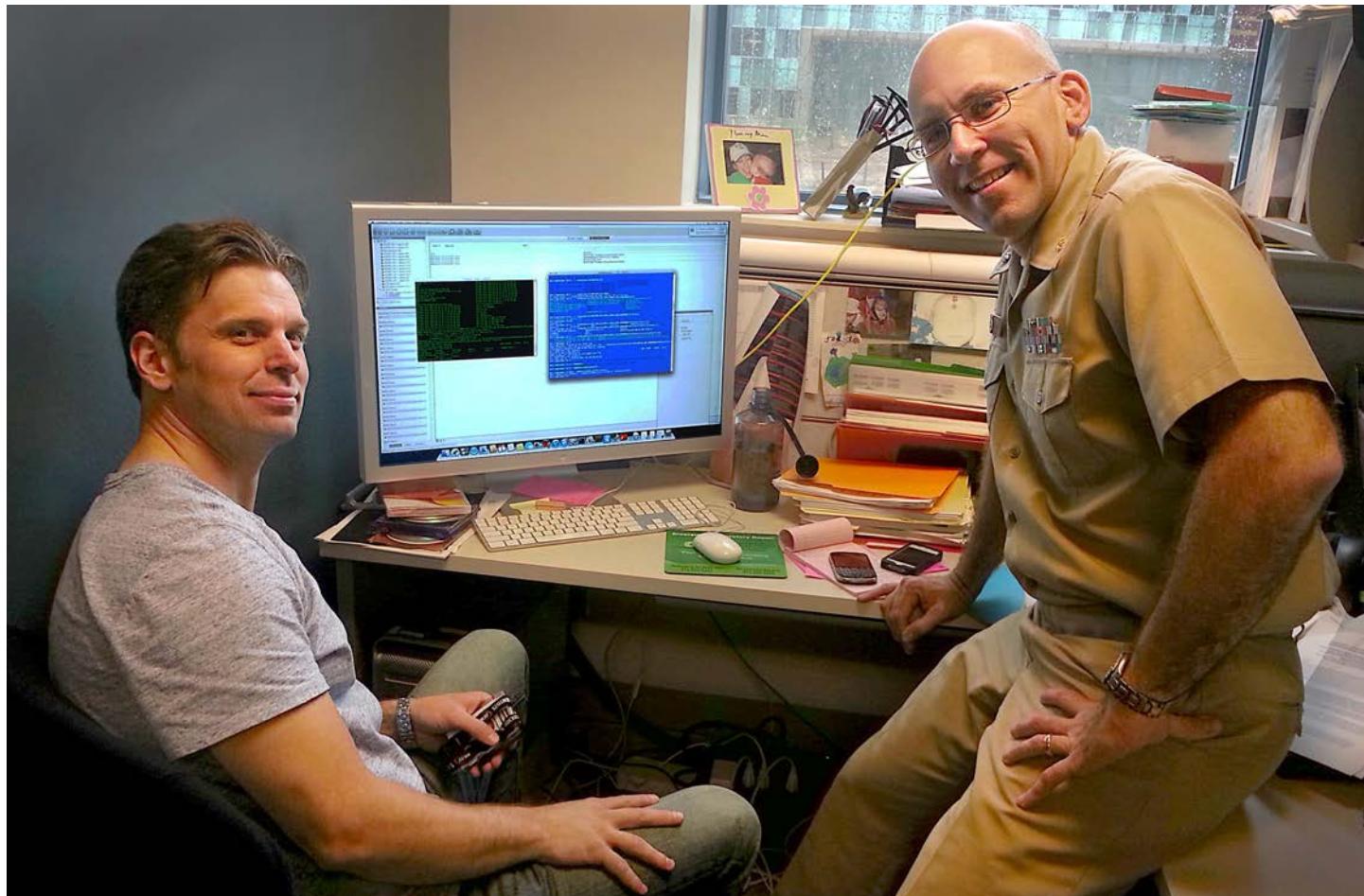
The local and regional focal point for these joint opportunities is the CDC Global Disease Detection (GDD) unit located within NAMRU-3. Established at NAMRU-3 in 2006, "our" GDD is one of ten in CDC's global network, and the only one integrated within a DoD OCONUS laboratory. As such it provides a unique and timely demonstration, and test bed, for DoD Health / DHHS cooperation and synergy overseas. Dr. Mark Wooster, Capt. MSC USN (ret), is the CDC-affiliated Director of the GDD unit. As a former XO of NAMRU-3 Cairo, and former CO of NAMRU-2 Jakarta, he is ideally qualified to guide further developments along these lines in ways that also help to sustain and enhance NAMRU-3's core BUMED mission execution. NAMRU-3 has weathered two ordered evacuations in the last three years, and has shared, along with our Egyptian hosts, a security environment that has been unsettling at times.

Through all the challenges, Egyptian and American staff alike have remained steadfast in duty. It is a privilege for each of us to be associated with this institution, for which, Insha'Allah, many years of continued scientific achievement and meritorious service lie ahead.

NAMRU-3 Commanding Officer sends,
John Gilstad, CAPT, MSC, USN

NMRC Researchers Publish Genome Sequence of MERS Virus

Story courtesy of Naval Medical Research Center Public Affairs



Dr. Kenneth Frey (left) the project lead and primary author on the MERS virus genome sequence publication and Cmdr. Guillermo Pimentel, Deputy Director of the NMRC Biological Defense Research Directorate (right) review current sequence data. (Photo courtesy of Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., – A team of researchers from the Naval Medical Research Center, the National Institute of Allergy and Infectious Diseases, and the U.S. Naval Medical Research Unit No. Three (NAMRU-3) in Cairo, completed a full genome sequence of the Middle Eastern Respiratory Syndrome (MERS).

MERS is a recently emerged virus that can cause a highly lethal pneumonia. While the majority of the cases are limited to the Middle East, there have been cases reported in Europe and at least two confirmed cases in the United States. The sequence data were published in the online journal *Genome Announcements*.

The genome sequence and manuscript are a result of this multi-center effort to develop vaccines and medical

countermeasures to combat the virus.

Dr. Kenneth Frey, the project lead in the Genomics Department at NMRC's Biological Defense Research Directorate (BDRD) is the primary author of the publication.

"When we examined the genetic changes in the virus, we found that it seems to be evolving at a very slow rate," said Frey. "This is a critical finding that will enable development of vaccines and therapeutics."

Cmdr. Guillermo Pimentel, Deputy Director at BDRD, added, "Publication of this genome is a key step in organizing and developing an effective public health response to this new threat."

It is the hope of our research team that the genome is stable enough to target surface proteins with antibody or small molecule therapies."

BDRD, located at Ft. Detrick in Frederick, Maryland, is recognized as a world leader in detection and confirmatory analysis of bio-threat agents. Researchers there have made major strides in genomics, bioinformatics and bacteriophage research.

They have undertaken a large-scale high throughput genomics effort in sequencing all agents closely related to classic bio-threat agents.

The laboratory has the latest sequencing technology and bioinformatics capabilities to sequence over 100 bacterial genomes per year.

NAMRU-6 Head of Virology and Emerging Infections Department Major Player in WHO Ebola Response

Story courtesy of NAMRU-6 Public Affairs



Dr. Daniel Bausch (left), Head of the Virology and Emerging Infections Department of the U.S. Naval Medical Research Unit No. Six (NAMRU-6), and a colleague ready to enter the isolation ward in Conakry, Guinea. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru - Dr. Daniel Bausch, Head of the Virology and Emerging Infections Department of the U.S. Naval Medical Research Unit No. 6 (NAMRU-6), has played a major role in the response to the ongoing outbreak of the deadly Ebola virus disease in West Africa.

As it stands the Ebola outbreak in West Africa has become the largest outbreak of the disease on record with nearly 800 cases and 500 deaths.

Formerly with the Center for Disease Control and Prevention (CDC) Special Pathogens Branch, Bausch specializes in the research and control of viral

hemorrhagic fevers with extensive experience in sub-Saharan Africa, Latin America, and Asia combating pathogens such as Ebola virus, Lassa virus, hantavirus, and SARS coronavirus.

Bausch led projects with the CDC, Tulane University, and the World Health Organization (WHO) on a similar viral hemorrhagic disease, Lassa fever, in the same geographic area as the present outbreak of Ebola virus.

With his knowledge of both the disease and the region, it was only natural that WHO would call on him for assistance. Bausch has now gone twice to the region

as part of the WHO Global Outbreak Alert and Response Network.

He spent the majority of April in the outbreak epicenter in Guéckédou, Guinea, assisting the Ministry of Health and other partners with varied elements of the response effort. Bausch helped establish systems for case identification and patient care and contact tracing. He also worked as a clinician treating patients with Ebola virus disease in the isolation ward in the capital Conakry.

At the end of April the number of cases seemed to be waning and Bausch was able to rejoin his team at NAMRU-6.

"There comes a time in these outbreaks when you hope things are under control," Bausch said. "However, you can't have surveillance in every remote village. You watch and wait. Sometimes it's indeed over, and sometimes there's a sudden knock on the door telling you that numerous people just died in some village you've never heard of."

Unfortunately, the latter turned out to be the case in Guinea, where cases were indeed still incubating in remote villages on the borders of Sierra Leone and Liberia.

A resurgence was soon noted, complicated by the extensive cross-border circulation of the local population, who often affiliate more with ethnic-linguistic groups scattered on both sides of the border than with nationality.

As things have spiraled out of control, WHO asked Bausch to go to Sierra Leone, familiar territory for him from his many years working there on Lassa fever projects.

"It's great to be back in Sierra Leone," Bausch said. "but I wish it could be for a different reason."

Naval Health Research Center Awarded First Grant to Examine Gender in Military Sexual Assault

(continued from page 1)

in the assaults that male and female service members experience, as well as differences in how they interpret or describe those experiences," noted Thomsen.

The DoD Annual Report on Sexual Assault in the Military estimates 14,000 men and 12,000 women were victims of unwanted sexual contact among active duty forces in fiscal year 2012. Moreover, the results from the 2012 Workplace and Gender Relations Survey of Active Duty Members show that victimization experiences of men and women seem to be different.

Stephanie McWhorter, Chair of CHARS and associate investigator for the project, highlighted the expertise that CHARS brings to the effort. McWhorter explained that the members of CHARS have different areas of expertise, but what they have in common is their interest in whether military service is different for men and women and if so, how.

"We acknowledge gender conditions people's experiences in the military," noted McWhorter. "And without looking at both genders, it's hard to make sense of what unique issues confront each of them."

The team planned a three-phased approach to the project starting with secondary analysis of existing data. They also plan to collaborate with the experts on military sexual assault from the Army, Air Force and Navy, including those who work directly with victims and experts from the Department of Veterans Affairs.

"We train nurses, therapists, advocates, and a host of other military personnel to assist victims of sexual assault and we want their expertise and experiences," explained Capt. Jacqueline Rychnovsky, the project's principal investigator and NHRC's commanding officer. "This also ties in why receiving funding from TSNRP is a good fit. Nurses are often on the front lines interacting with the victims when trust and timing is critical."

Phase two involves a brief, anonymous

internet survey about challenging workplace relationships and phase three is where the team will conduct in depth interviews with a voluntary group of male and female military service members.

The team anticipates the study will conclude in 2016.

"Our research is timely and it may have implications for sexual assault treatment or training," noted Thomsen. "But we know additional research will be needed -- this is only the beginning. At the very least, we hope this will give us a better understanding of the parameters of what male victims of sexual assault go through."

As the DoD's premier medical research center, NHRC's cutting-edge research and development is used to optimize the operational health and readiness of the nation's armed forces. Within close proximity to more than 95,000 uniformed service members, world-class universities, and industry partners, NHRC's expert team sets the standards in joint ventures, innovation, and practical application.

Naval Health Research Center Facts

The Naval Health Research Center was established in June 1959, as the U.S. Navy Medical Neuropsychiatric Research Unit (NPRU). Designated as the Navy's primary research capability in the areas of psychiatry and neurology, NPRU's mission, defined by the Secretary of the Navy, was "to conduct research in the area of neuropsychiatry as it applies to the naval service."

Due to its close proximity to a variety of potential research populations including recruits and patients, sailor and Marines, and all naval platform types, Point Lima in San Diego, California was an ideal location.

It was also near the research arms of the then Bureau of Naval Personnel and the Navy Electronics Laboratory, currently named Space and Naval Warfare System Command (SPAWAR), San Diego. In 1974, but authority of the Chief of Naval Operations, NPRU was re-designated as the Naval Health Research Center with the mission, "to study medical and psychological aspects of health and performance among naval service personnel."



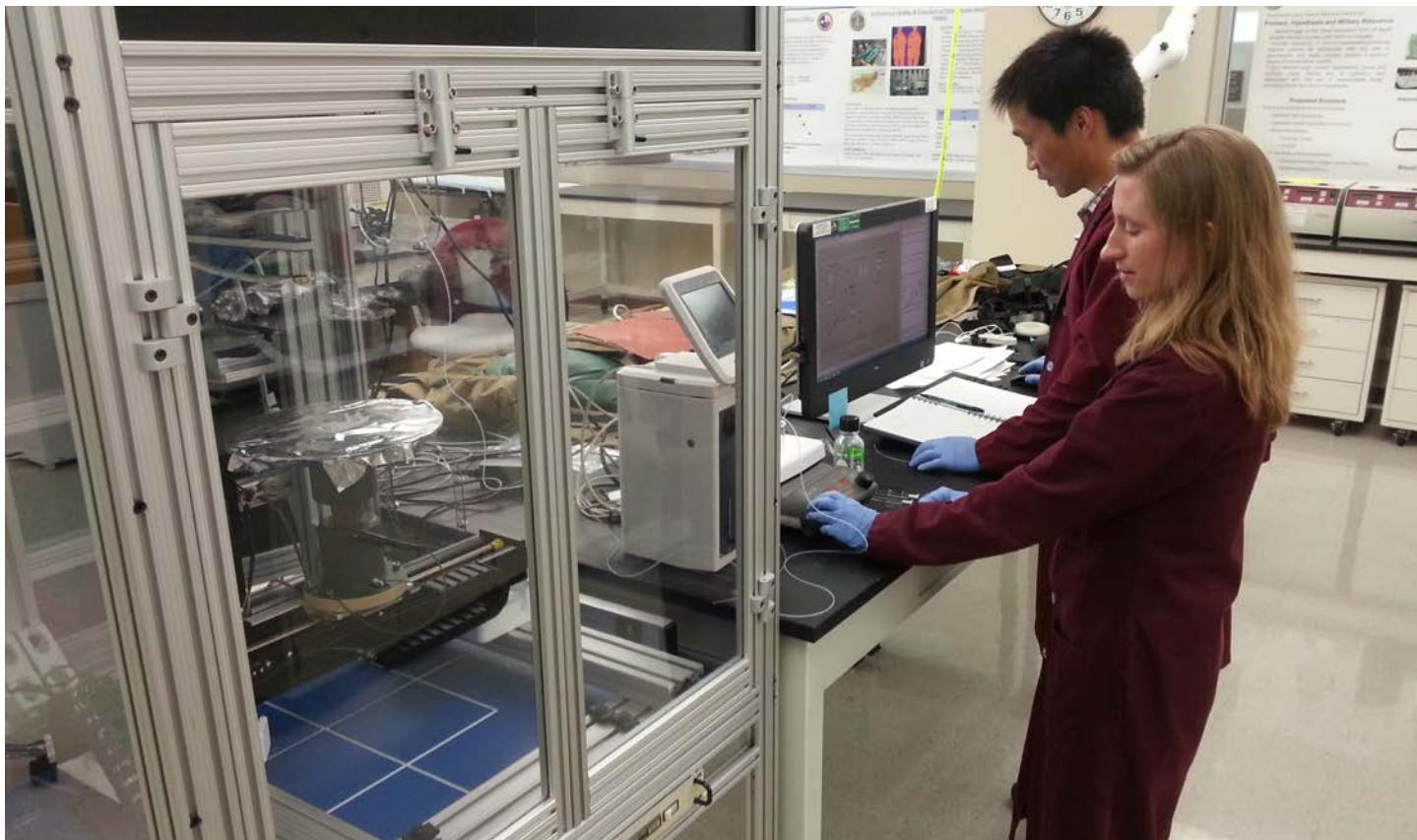
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Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

NAMRU-SA Seeks to Enhance Wound Treatment using Biocompatible Nanofiber Technology

Story by Dr. Natalie Forbes, NAMRU-SA Public Affairs



Dr. Natalie Forbes (front), Postdoctoral Fellow, and Mr. Tony Yuan (back), Postgraduate Research Intern, electrospinning a nanofiber scaffold to create a biomimetic wound dressing. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO - Researchers at the Naval Medical Research Unit San Antonio (NAMRU-SA), are currently developing biocompatible nanofiber technology to enhance wound treatment. Specifically, scientists plan to integrate nanofibers into coatings for use on medical materials, such as titanium implants, to improve treatment for craniofacial injuries. These nanofibers can deliver bioactive agents at a sustained rate and can be assembled into a 3-D architecture to guide cell behavior.

To synthesize the nanofibers, NAMRU-SA's biomedical engineer team constructed a custom electrospinning apparatus. The electrospinning process is currently used in industry for the manufacture of air filters and other items requiring a thin application of multiple layers of fibers.

In using the electrospinner for the creation

of a nanofiber-based coating, a polymer solution is first fed through a spinneret under an applied electric field, the droplets elongate under the electric charge, and a thin, continuous fiber of submicron diameter is created.

The nanofiber composition and structure are readily controlled during the electrospinning process, enabling the user to tailor nanofibers to a wide variety of biomedical applications.

A project underway at NAMRU-SA will explore the mechanical properties of nanofiber wound dressings, and describe the release of bioactive factors and their impact on cellular behavior. Nanofibers will be electrospun into a scaffold to create a biomimetic wound dressing.

The nanofiber scaffold will promote tissue repair by creating a surface which mimics

that of the natural cellular environment, while simultaneously releasing growth factors to accelerate healing and potentially minimize the formation of scar tissue.

Researchers may also use nanofibers to develop antimicrobial coatings on cranial implants. Nanofibers can be loaded with antibiotic drugs and then bonded to the surface of the implant to achieve localized sustained release of the drug.

Using nanofiber coatings may reduce the incidences of postoperative bacterial infection and subsequent surgeries due to implant rejection.

While development of the nanofiber technology is ongoing, these nanofiber coatings offer the potential to improve patient outcomes and reduce costs associated with wound treatment.

NSMRL Military Hearing Preservation Training Kit Transition

Story courtesy of NSMRL Public Affairs



The Hearing Preservation Training Kit, developed by Sensimetrics, Inc., incorporates interactive components into educational activities with demonstrations of auditory injury. (Photo courtesy of NSMRL Public Affairs)

GROTON, Conn., – After a visit by the Hearing Center of Excellence (HCE) to the Naval Submarine Medical Research Laboratory (NSMRL) in April, the transition process is ramping up for the Military Hearing Preservation (MHP) Training Kit.

During the visit, initial discussions were held as to a path that will bring the MHP Training Kit out of the developmental phase and into the implementation phase. Subsequent discussions between stakeholders from HCE, NSMRL and the Office of Naval Research (ONR) have been held as the plan continues to take shape.

Development of the MHP Training Kit was completed by Sensimetrics, Inc. from Boston, and has been overseen by Dr. Lynne Marshall of NSMRL with funding provided by ONR. The MHP Training Kit contains a set of software-based educational tools specifically designed for hearing conservation program managers and technicians providing training. It is designed to be flexible in its use both in the number of people trained at a given time and the location of training – in the office or in the field.

The MHP Training Kit incorporates interactive components into educational activities with demonstrations of auditory injury – hearing loss and/or tinnitus. One component contains examples of speech, music, and military scenarios that can be altered in real-time so the audience can experience the effects of simulations on communication. Another component is comprised of small segments of audio-visual informational course material. These segments can be combined in a modular fashion to form presentations that can be used in training briefs or audiological counseling sessions.

Using the MHP Training Kit reinforces the need to preserve and protect service member's hearing. Its intent is to motivate the service members to protect their hearing and intervene on behalf of others. Previous iterations of the MHP Training Kit reviewed at development meetings were well received by military audiologists. Military audiologists evaluated the current version of the kit within their practice and provided positive preliminary results.

The field evaluation is in its final stages. The final report is expected to be available later this year.

DoD Hearing Center of Excellence Team Visits NSMRL

Story courtesy of NSMRL Public Affairs

GROTON, Conn., - Senior leadership of the DoD Hearing Center of Excellence (HCE) toured the Naval Submarine Medical Research Laboratory (NSMRL). Demonstrations on research and development that NSMRL is capable of producing were given. HCE personnel were impressed by research capabilities of principal investigators and the unique facilities at NSMRL.

Guests included, Col. Mark Packer, HCE Executive Director; Dr. Lynn Henselman, Deputy Director; Ms. Tanisha Hammill, Senior Research Administrator; and, Dr. Douglas Brungart, Associate Director Research.

Dr. Jeremy Federman spoke to visitors about understanding speech during communication device-use and fit-testing of hearing protective devices. A speech-in-noise test was demonstrated using simulated Navy ship engine room noise. Dr. Michael Qin discussed underwater noise exposures and Dr. Kelly Watts demonstrated development of the Military Hearing Preservation Training Kit.

The ongoing epidemiological studies of the submarine force interested Packer because similar efforts are underway regarding conditions of hearing loss and tinnitus across the DoD.

"NSMRL has hyperbaric chambers placed virtually next to large anechoic and reverberant chambers," said Packer. "[This] provides the researchers here unique opportunities to serve the interests of the armed forces, particularly as they relate to auditory system issues."

After the visit, Packer expressed his appreciation. "Thank you for allowing us to see the work your lab is [doing to] understand the problems of acquired hearing loss in the Navy. I can see how research coming out of NSMRL will have immediate benefits to the submarine community, the Navy and eventually [other] services."

NMRC, NAMRU-6 and USU Team Launch Fourth Site for Treatment of Travelers' Diarrhea

Story by Cmdr. Mark S. Riddle, Naval Medical Research Center Public Affairs



(Left to right) Dr. Ricardo Aviles, Ms. Tameka Smith, Sgt. Catherine Tharpe, Lt. Col. Huy Luu, 1st Lt. Jewell Hemmings, Ms. Jamie Fraser, Cmdr. Mark S. Riddle, Dr. Giselle Soto (Photo courtesy of Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., - A research team from Naval Medical Research Center (NMRC), the U.S. Naval Medical Research Unit No. Six (NAMRU-6), and the Infectious Disease Clinical Research Program of the Uniformed Services University (USU), visited Soto Cano Air Base in Honduras in June.

The researchers were on-site to prepare and train with Joint Task Force Bravo Medical Delegation for the initiation of a fourth study site directed at a treatment of acute diarrhea and dysentery (i.e. travelers' diarrhea [TD]).

This site adds to the other sites in Afghanistan, Djibouti, and Kenya. The study is funded by the BUMED Wounded Ill and Injured program to conduct a United Kingdom-U.S. collaborative

multi-site antibiotic treatment trial among deployed military personnel seeking care for TD.

The primary goals of this research are to accelerate time to return to duty following an acute infectious diarrhea episode, generate critical evidence to fill current gaps in clinical management of acute infectious diarrhea in deployed military, and produce a clinical practice guidance (CPG) for broad application in deployed military settings.

To achieve these aims, a multi-site Randomized Controlled Clinical Trial started in September 2012 to assess the equivalence of three different single dose antibiotic regimens (azithromycin 500mg, levofloxacin 500mg, rifaximin 1650mg) augmented with loperamide for efficacy

in treatment of ambulatory subjects presenting with acute diarrhea.

In addition, the trial will evaluate the equivalence of azithromycin 1000mg with and without loperamide for efficacy in treatment of ambulatory subjects presenting with dysentery or diarrhea plus fever.

The results from this clinical trial will be combined with an exhaustive review and integration of epidemiologic and clinical trials literature to develop evidence-based guidelines for management of diarrhea in deployed troops globally and on a regional basis.

The end results will include the development of clinical practice guidelines on the management of deployment-related TD.

TD is a major health threat to readiness and continues to decrease human performance during combat and non-combat operations.

Beyond the acute effects, an accumulating body of evidence raises serious concerns about the long term health and fiscal consequences to these infections which can include chronic deployment-associated gastrointestinal, rheumatologic, and neurological sequelae.

Currently available strategies to mitigate the disease are primary prevention through improved field sanitation and individual hygiene countermeasures and secondary prevention through early and effective treatment.

To the latter strategy, recent reports have highlighted a current deficit in effective management of TD in deployed settings due to a combination of the lack of clinical trial evidence for deployment-adapted treatment regimens (single-dose regimens) and gaps in provider knowledge and clinical management practices.

NMRC Wound Infections Department Explores Therapeutic Bacteriophage against Multidrug Resistant Bacterial Wound Infections

Story courtesy of Naval Medical Research Center Public Affairs



Lt. James Regeimbal, a research in NMRC's wound infections department, speaks during seminar on exploratory use of bacteriophage as a therapeutic in the Behnke auditorium. (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., -- The Naval Medical Research Center's (NMRC) Wound Infections Department is exploring the use of bacteriophage as a therapeutic against Multidrug Resistant (MDR) bacterial wound infections.

The emergence of MDR skin and soft tissue infections has become a global problem for civilian and military populations alike, and in the warfighter, these infections are especially problematic when associated with traumatic/blast wounds.

"MDR wound infections often require extensive surgical debridement, which further removes tissue harboring the recalcitrant infection," said Lt. James Regeimbal, a microbiologist in the NMRC Wound Infections Department. "Increasing the tissue loss in a severely wounded soldier can debilitate well beyond the damage of the original injury and new therapeutics are needed to

improve the recovery and functionality of healing wounded warriors. It is vital to generate new therapeutics or reinvigorate older approaches to treating bacterial infections."

Bacteriophage are viruses that specifically infect and kill bacteria, and have been investigated as a potential antibacterial therapeutic. NMRC's phage working-group purified five types of bacteriophage from waste-water in the Washington D.C. metro area that infect and kill MDR *Acinetobacter baumannii*.

"*A. baumannii* is a Gram-negative capsulated *coccobacilli* that causes significant infections in severely wounded military personnel," said Regeimbal. "In joint collaboration with both the NMRC Biological Defense Research Directorate, and Walter Reed Army Institute of Research -Wounds Department, our therapeutic phage cocktail greatly reduces the morbidity associated with the

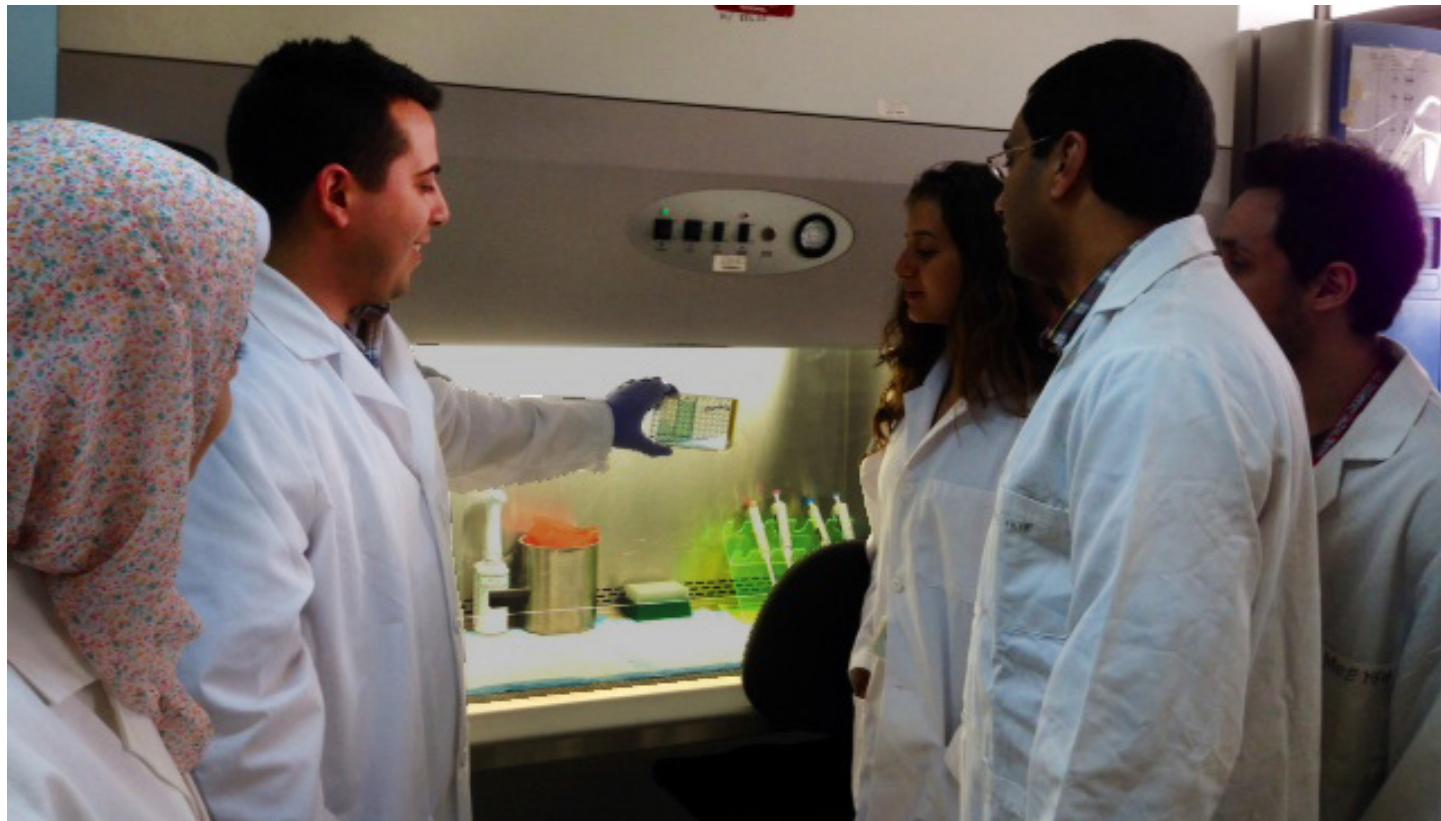
infection, primarily because the bacterial burden in the wound is significantly reduced with therapeutic phage treatment."

Regeimbal added, "The cocktail also prevents bacterial invasion of the tissue surrounding the wound-bed that is seen in untreated controls. This apparent tissue protection reduces the ultimate size of the wound and the time to healing. The phage therapeutic also reduces the bacterial biofilm associated with the wound and eliminates the mortality and paralysis associated with *A. baumannii* wounds in mice."

NMRCs Wound Infections Department seeks to isolate a diverse collection of phage from around the globe, in partnership with the OCONUS labs that can cover 80 to 90 percent of the methicillin-resistant *Staphylococcus aureus* (MRSA) and *A. baumannii* strains currently seen in the clinic.

NMRC Develops MERS Micro Neutralization Assay

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



NMRC Microbiologist, Lt. Jose Garcia teaches NAMRU-3 researchers about the micro neutralization assay developed for MERS-CoV in a NAMRU-3 lab in Cairo. (Photo courtesy of Lt. Jose Garcia)

SILVER SPRING, Md., – Naval Medical Research Center sent a Microbiologist to Cairo to train research scientists at Naval Medical Research Unit No. Three (NAMRU-3), on the procedures of a micro neutralization assay developed to combat Middle East Respiratory Syndrome Coronavirus (MERS).

According to the United States Center for Disease Control and Prevention (CDC), MERS is a beta coronavirus. It was first reported in Saudi Arabia in 2012 and has a 30 to 40 percent mortality rate, mainly among elderly or immune deficient individuals. As of May, there have been 572 laboratory-confirmed cases of MERS in 15 countries.

The majority of MERS cases have been identified in Middle Eastern and Northeast African countries. NAMRU-3's Cairo location makes the facility a possible target area for MERS cases in the region. The neutralization assay was developed by research scientists in NMRC's Viral

Rickettsial Diseases Department.

“Egypt got its first case as of a month ago,” said Lt. Josue A. Garcia, the microbiologist sent to train NAMRU-3 staff. “My main job was to go to NAMRU-3 and train scientists on the MERS-CoV micro neutralization assay developed here at NMRC. It is a serological assay in which we are able to determine within serum samples if that serum contains antibodies that are neutralizing against the MERS-CoV virus. Basically, we are able to determine if a person has been exposed to the virus with this assay.”

The micro neutralization assay is the first of its kind for MERS. NMRC’s main role in the production of this assay was developing controls.

“We have a TC-bovine [genetically engineered cattle] model, which is basically a model that is genetically engineered with human antibodies,” said

Garcia. “These [models] are injected with MERS and as a result produce a large amount of antibodies against MERS. As of right now we are still scratching the surface with this assay, but we are waiting to test this against actual patient samples.”

Because patient samples are very hard to come by, researchers at NMRC are working on developing a baseline using the assay from serum samples of patients never exposed to MERS.

“We have our collection of serum from patients that have never been exposed to the virus,” said Garcia. “These serum samples were taken before MERS was detected and they are from the United States.”

NMRC’s Viral Rickettsial Diseases Department is part of the Infectious Diseases Directorate (IDD). IDD conducts research on infectious diseases that are considered to be significant threats to deployed sailors, marines, soldiers, and

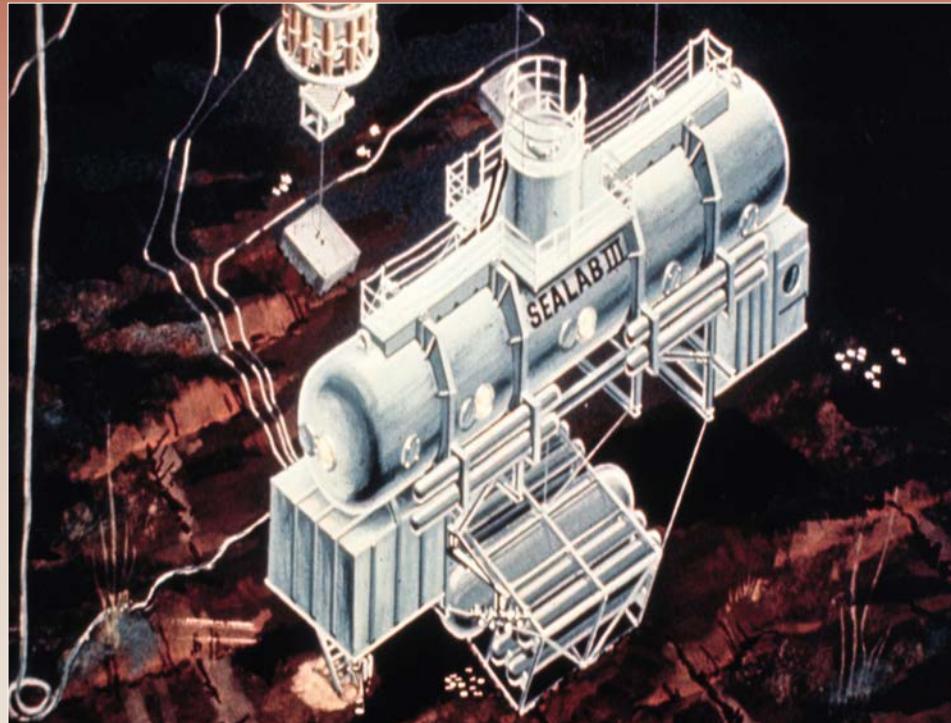
R&D Chronicles:

Captain George Bond and the World of Undersea Research, Part III

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery

“If need be, we could work well into the night as it didn’t make a lot of difference to the bottom dwellers. Days looked like nights; it was dark on the bottom all the time.”

~QMC Bob Barth, Aquanaut, SEALAB II



SEALAB III never quite lived to its potential. The sudden death of one of its aquanauts would bring the SEALAB program to a premature end. Courtesy of the National Oceanic and Atmospheric Administration (Photo courtesy of NOAA)

Commencing August 28, 1965, SEALAB II was an ambitious and, arguably, the most successful of the U.S. Navy’s missions to gauge the capabilities of saturation diving and undersea habitation. Planted 205 feet below the ocean surface off the coast of LaJolla, Calif., SEALAB II was a 57-foot habitat that contained a special laboratory, a watch station, a galley, showers, toilets, eleven viewing ports, and living space for 10 aquanauts at a given time.

Over the course of its 45-day mission, the SEALAB capsule accommodated three teams of 10 divers (each team in 15-day increments); these aquanauts would amass a total of 450 saturation dive hours outside the habitat conducting plankton sampling,

bioluminescent studies, marine life census while continuing the human and animal physiological studies of the previous mission.

Former Mercury astronaut, Cmdr. Scott Carpenter served as leader for two of the three rotating teams and was only one of two aquanauts to spend one-month below the surface (the other being Navy physician Lt. Cmdr. Robert Sonnenberg). Early in the mission Carpenter made history communicating via “earthlink” with astronaut Gordon Cooper who was then orbiting the planet in his Gemini spacecraft some eight atmospheres away.

This first “Sea-to-Sky” communication feat was soon followed by the first “Sea-

to-Sea Habitation” link when SEALAB II exchanged messages with Cousteau’s CONSHELF III crew then submerged 330 feet off Villefranche-sur-Mer in the Mediterranean.

SEALAB II also featured the services of a Navy-trained dolphin named “Tuffy.” As the unsung 29th member of the team, Tuffy transported much needed supplies and tools to the aquanauts and performed “lost diver” drills. Aquanaut Bob Barth would later recall his first encounter with his bottled-nose colleague.

“Ken [Conda] and I would go outside when the folks topside would tell us they were ready to send Tuffy down. We would wander away from the habitat...and Ken would turn on the pinger device he carried. Before too long, there would be a streaking shadow and a giant swoosh, and then this damn big fish would be sitting right in front of us smiling. The first time that he roared down on us scared the hell out of me...”

The success of SEALAB II ensured the continuation of the project and in February 1969, the third phase was launched. Now 45-aquanaut strong (five teams of nine), the SEALAB III habitat was submerged 610-feet below the ocean surface off San Clemente Island, California. Immediately, the habitat (modified SEALAB II capsule) began to leak and teams of aquanauts were sent down to conduct repairs.

On one such visit, aquanaut Berry Cannon died suddenly of what was later determined to be carbon dioxide poisoning on account of a faulty “rebreather.” With Cannon’s death, and fear of bad publicity, the third phase of the program, as well

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NMRC's Bone Marrow Research Directorate Offers Walk-In Clinics for New Donors to Register

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Air Traffic Controller 2nd Class Jerelyn Alvis, left, and Air Traffic Controller 2nd Class Richard Morton swab for DNA samples during a bone marrow drive aboard the aircraft carrier USS Theodore Roosevelt (CVN 71). (U.S. Navy photo by Mass Communication Specialist 2nd Class Joshua Bruns/Released)

SILVER SPRING, Md., -- Since 1991, the Naval Medical Research Center's (NMRC) Bone Marrow Research Directorate (BMD) has played a critical role in the collection and analysis of donor swabs and the storage of individual donor data for the C.W. Bill Young Department of Defense (DoD) Marrow Donor Recruitment and Research Program (BYMDP).

Providing overall management of the program, BMD researchers support bone marrow drives identifying potential bone marrow donors to ensure BYMDP continues to thrive. One little known method of collection, bone marrow walk-in clinics, guarantees year-around donation capabilities outside of classic

bone marrow drives.

For the past 15 years, walk-in clinics throughout the world have gradually increased in number. As it currently stands, there are 52 walk-in clinics throughout 25 different states and four foreign countries. All walk-in clinics are managed by on-call volunteers and locations range from blood banks and hospitals, to clinics and military bases. These volunteers can answer questions, provide consent forms and mail-in kits to interested individuals.

"First step to coming to a walk-in clinic to make a donation is scheduling an appointment with the on-call volunteer," said Dr. Robert Hartzman, Director

of NMRC's Bone Marrow Research Directorate and the C.W. Bill Young Department of Defense Marrow Donor Recruitment and Research Program.

"Once the appointment is made, the individual will show up to the walk-in clinic site and the volunteer will walk them through the buckle swab process. After they complete the donation, which includes filling out the necessary DoD paperwork, the volunteer sends the donation to us via mail."

These walk-in clinics were developed as a secondary convenient option for individuals who have a desire to be registered in the bone marrow database. Though not a primary way of collection, walk-in clinics provide the registry with more than 500 new potential donors per year.

"Marrow donor drives are offered at every DoD facility across the world that would like to participate," said Hartzman. "There are more than 700,000 individuals who have registered with our bone marrow program and are familiar with the program. There are also more than 5,000 individuals in DoD over the last 20 years, who have actually donated marrow for a transplant. Some of these individuals truly want to help gather registrants."

For individuals interested in coordinating a bone marrow donor drive visit the Bone Marrow Salute to Life website at <https://www.salutetolife.org/joinus.html>. Additionally, a complete list of walk-in clinic locations is available on the web site.

A research leader in BYMDP, BMD provides military contingency support for casualties with marrow toxic injury due to radiation or chemical warfare agents.

The directorate performs laboratory research that supports technology innovations to make highly reliable and cost-effective DNA-based typing for marrow transplants.

Captain George Bond and the World of Undersea Research, Part III

(continued from page 11)

as the program itself was cancelled. In frustration, one aquanaut later commented that the mission to the moon survived three astronaut deaths, and no one in that program quit; rather, it drove NASA to “bigger and better things.”

Bond's dream may have dimmed a little with the end of SEALAB, but it did not die. From Tektite to Aquarius, saturation diving and under water habitats stretched the boundaries of scientific knowledge. To date, the limitations of underwater habitation has been stretched to over 69 days and saturation dives of over 2,000 feet. Although, Bond would not live to see vast human colonies under the sea, his legacy and his recognition as one of the first “dreamers” lives on today.

Bond would serve as a namesake for future underwater habitat projects and an ocean simulation facility. In 2013, Bond was posthumously awarded the “Diving Pioneer Award” by the Historical Diving Society and was the focus of Ben Hellwarth’s seminal book, SEALAB: America’s Forgotten Quest to Live on the Ocean Floor (2012).



The unsung 29th member of the SEALAB II team, Tuffy the bottlenose dolphin proved an invaluable link from capsule to topside over the course of the 45-day mission. (Photo courtesy of the Naval History and Heritage Command)

NMRC will be Featured on Navy Medicine's YouTube Show SCRUBBING IN



Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs



NAMRU-3 Holds Change of Command Ceremony

Story courtesy of NAMRU-3 Public Affairs



Former NAMRU-3 Commanding Officer, Capt. Buhari Oyofo (left) and NMRC Commanding Officer, Capt. John Sanders (center), stand as new NAMRU-3 Commanding Officer Capt. John Gilstad (front right) speaks at the change of command ceremony. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO, – The U.S. Naval Medical Research Unit No. Three (NAMRU-3) welcomed the 29th commanding officer at a Change of Command ceremony, June 19.

The laboratory's research focuses on emerging and re-emerging disease threats of military and public health importance. NAMRU-3 researchers partner with host nations and international and U.S. agencies in CENTCOM; EUCOM, and AFRICOM areas of responsibility.

Capt. John R. Gilstad assumed command from Capt. Buhari Oyofo in a morning ceremony which was attended by the Charge D'Affaires of the U.S. Embassy, Mr. Marc Sievers and the Egyptian Minister of Health and Population, Prof. Dr. Adel Adawy.

Also in attendance were special guests from Ghana, Dr. Kwadwo Koram, Director of the Noguchi Memorial Institute of Medical Research; and Colonel

Mahama Alhassan, Director General, Ghana Armed Forces Health Directorate.

Officiating at the Change of Command was the Naval Medical Researcher Center's (NMRC) Commanding Officer, Capt. Sanders, who said, "This is another important milestone in the distinguished history of NAMRU-3. We appreciate the good leadership of Capt. Oyofo. We are also looking forward to the new assignments of both Capt. Gilstad as CO and Capt Blair as the new Executive officer, and the energy they both will bring to these new assignments."

NAMRU-3 also welcomed Capt. David Weiss, the AFRICOM Surgeon; Capt. Kevin Russell, Armed Forces Health Surveillance Center; Dr. Kevin Porter and Capt. Eric Hall of NMRC, and Embassy mission and local community guests.

Weiss said, "NAMRU-3 does significant research work on the African continent

and other parts of the world. It is fully engaged with multiple African partners. We are sad to see Capt. Oyofo depart, but we are confident that Capt. Gilstad will continue to propel NAMRU-3 to even greater achievements."

Capt. Gilstad's wife, Dr. Colleen Gilstad pinned on the trident-shaped command pin as part of the time-honored tradition, recognizing the transfer of total responsibility, authority and accountability to the new commanding officer.

Capt. Oyofo was joined by his wife Tina, two of his children, and several members of his family from Nigeria and the United States who came for this important event.

The Master of Ceremonies, NAMRU-3 Executive Officer, Capt. Frederick Landro, summed up the events with his closing comments. "Good night and good luck."

NAMRU-6 Team Visits Instituto Conmemorativo Gorgas, Panamá

Story courtesy of NAMRU-6 Public Affairs



Deputy Director of The Gorgas Institute, Dr. Juan Pascale (left) is pictured with NAMRU-6 Commanding Officer Capt. Kyle Petersen (right). Petersen visited the institute, located in Panama City, Panama, to initiate collaborations. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru – U.S. Naval Medical Research Unit No. Six (NAMRU-6) Commanding Officer, Capt. Kyle Petersen and Science Director, Dr. Claudio Lanata visited Panama City, Panama, to initiate collaborations with the world-renowned Gorgas Institute.

Panama is a crucial country in the Americas as it is a major inter-oceanic trade hub and has the potential to be a point of entry for diseases from Asia, Europe or Africa into Americas.

Physicians at the Gorgas Institute had recently seen patients in their clinic with the parasitic infection cutaneous

Leishmaniasis which had an unusual mucosal component.

This was important because 100 percent of known cases of *Leishmaniasis* in Panama are cutaneous and caused by the *L. panamensis* strain. If a new strain of mucocutaneous *Leishmania* has arrived in the country it would have profound impact on national patient care guidelines and would represent a new threat to public health.

The Gorgas Institute was looking to confirm the diagnosis at the Walter Reed Army Institute of Research using their culture and iso-enzyme speciation

technology and needed a confirmatory diagnosis at a second lab.

Having heard about NAMRU-6's state of the art multiplex PCR for *Leishmaniasis*, the Gorgas Institute contacted the command about collaboration.

While in Panama, Petersen and Lanata met with Dr. Nestor Sosa the Director, his deputy Dr. Juan Pascale and the new Research Director Mr. Raul Sotomayor and toured the facilities.

The Gorgas Institute is conducting state of the art entomology research with transgenic mosquitos to prevent Dengue. The institute also has a highly advanced training center which can provide epidemiological or laboratory training to all Central American nations.

Another interesting aspect of the visit was a stop at Hospital del Niño Panama to see Dr. Xavier Saez, the head of Infectious Diseases. Saez was piloting a trial of an electronic adverse event reporting system for one of his vaccine trials that uses a tablet or smartphone in place of a paper diary to record the patient subject's adverse symptoms.

During the trial the patients are provided with free tablets, which is a nice benefit for them, they log on and record symptoms daily and the data is managed almost instantaneously.

"This cutting edge technology is clearly the future of clinical trials, and it's exciting to see it employed for one of the first times in the world in a Latin American site," said Petersen. "Dr. Saez is to be congratulated and I look forward to him publishing his results into this state-of-the-art trial."

Petersen and Lanata left the institute extremely impressed and hopeful to have agreements signed shortly to provide diagnostic and training capacities for Panama and to collaborate on a number of other tropical disease projects.

Retirement Ceremony for Cmdr. R Michael D. Reddix Chock-full of Navy Tradition

Story courtesy of NAMRU-Dayton Public Affairs



Former NAMRU-Dayton Executive Officer, Cmdr. Michael D. Reddix (left), is presented with his shadow box by NAMRU-Dayton Commanding Officer, Capt. Jeffrey M. Andrews (right) during Reddix's retirement ceremony. Reddix's shadow box signifies 22 years of naval service. (Photo courtesy of NAMRU-Dayton Public Affairs)

DAYTON, Ohio, - Family, friends, and command members attended a retirement ceremony steeped in Navy tradition for Cmdr. Michael D. Reddix, previous executive officer at Naval Medical Research Unit Dayton (NAMRU-Dayton) at Wright-Patterson AFB (WPAFB), June 19.

The bell ringer sounded four bells as the boatswain mate piped the official party in for the ceremony and the sideboys stood at attention. The honor guard posted the colors and the band played the National Anthem.

Reddix graduated from the University of Illinois at Urbana-Champaign with a Ph.D. in Educational Psychology with an emphasis in cognitive psycho-physiology.

Over a 22-year active-duty career Reddix has executed meaningful aspects of the

Navy mission. His first assignment was Chief-Vision Science, Naval Aerospace Medical Research Laboratory.

The next four years he spent at Brooks Air Force Base, Texas, at the Head-Laser Department.

Following that, Reddix was in Norfolk, Virginia as Branch Head, Aviation Human Factors, Naval Safety Center and Head, Force-Human Factors, Commander Naval Air Force U.S. Atlantic Fleet.

He returned to San Antonio as Officer in Charge, Naval Health Research Center Detachment, Directed Energy Bioeffects Laboratory, Brooks City-Base, and reported as Executive Officer, Naval Medical Research Unit San Antonio.

Reddix received several personal military awards throughout his career and Lt.

Cmdr. Tuberson read the award citation from Vice Adm. Nathan, Chief, Bureau of Medicine and Surgery.

"Reddix was hand selected to take on the elevated level of responsibility and successfully provided his talents by managing two key command positions as NAMRU-Dayton's Executive Officer. He also took on the duties of a technical advisor scientist for the Aeromedical directorate, executing the command's \$9.5 million Environmental Health and Aeromedical mission through an unprecedented."

NAMRU-Dayton's Commanding Officer Capt. Jeffrey M. Andrews, was the presiding officer and guest speaker at the ceremony.

Reddix requested permission to go ashore for the last time, "Permission granted," said Andrews. As the four bells rang, "Navy family, retired, departing," was stated and Anchors Aweigh concluded the retirement ceremony.



ABOVE: Former NAMRU-Dayton Executive Officer, Cmdr. Michael D. Reddix (left), shakes the hand of NAMRU-Dayton Commanding Officer, Capt. Jeffrey M. Andrews (right) during Reddix's retirement ceremony. (Photo courtesy of NAMRU-Dayton Public Affairs)

Dr. Paul Weathersby of NSMRL awarded the UHMS Albert R. Behnke Award

Story courtesy of NSMRL Public Affairs



Dr. Paul Weathersby with the Albert R Behnke Award he received, June 20, at the UHMS at the annual meeting in St. Louis, Missouri. (Photo courtesy of NSMRL Public Affairs)

Groton, Conn., - Dr. Paul Weathersby of the Naval Submarine Medical Research Laboratory (NSMRL) was awarded the Undersea and Hyperbaric Medical Society (UHMS) Annual Albert R. Behnke Award, June 20.

This is the premier award of the UHMS and is presented to an individual in recognition of outstanding scientific contributions to advances in the undersea or hyperbaric biomedical field.

Dr. John Feldmeier, President, UHMS, presented the award to Weathersby at the annual meeting in St. Louis, Missouri, and he summarized Weatherby's contributions.

In 1984, Paul Weathersby co-authored a seminal paper at the Navy Medical Research Institute (NMRI) in Maryland, now Naval Medical Research Center, in which he applied survival analysis to the investigation of decompression sickness (DCS).

In 1986 he transferred to NSMRL and over the next 25 years, he and colleagues developed the method in more than 30 papers and reports that gave new insight into the reconciliation of decompression theory with decompression experience.

The key principle was recognition that a DCS incident is a probabilistic function of the depth-time-breathing gas history and not an inevitable consequence of the dive itself.

The method measured the optimal conformity between theory and empirical decompression trials from Canadian, United Kingdom, and U.S. Navy sources. Alternative theories based on differing hypotheses could be compared objectively to determine if one model described DCS probability and onset time better than another.

Its applications to decompression problems include mixed gas diving,

vascular bubbles, submarine rescue, saturation diving, dive trial design, decompression tables, and modern concepts regarding diving safety with extensions to oxygen toxicity and underwater breathing apparatus.

Survival analysis now underpins much of the U.S. Navy decompression practice in the Diving Manual, dive computer, and dive planner software. Unlike the simple and highly successful insights of John Scott Haldane at the beginning of the 20th Century, survival analysis is mathematically sophisticated and computationally intensive but has become more accessible with the advent of modern computing.

Weathersby's development of methods for estimating DCS probability and its successful application to divetable testing is the most significant advance in decompression theory since the work of Haldane.

Feldmeier ended his presentation by saying, "congratulations again and thank you for your contributions to the Society and the field!"

Weathersby is a retired Navy Captain and past commanding officer of NSMRL.

UHMS was formed in 1967. It is an international nonprofit association serving some 2,000 physicians, scientists, associates and nurses from more than 50 countries in the fields of hyperbaric and dive medicine. The UHMS is an important source of scientific and medical information pertaining to hyperbaric medicine involving hyperbaric oxygen therapy and diving through its bimonthly, peer-reviewed journal, *Undersea and Hyperbaric Medicine*, symposia, workshops, books and other publications.

It organizes an annual scientific meeting at different U.S. and international locations to permit review of the latest in research and treatment and to promote the highest standards of practice.

Navy Researchers earn Top Honors in Publications and Professional Development

Story by Anna Hancock, Naval Health Research Center Public Affairs



2014 Sleep Research Society Young Investigator Award

George Washington University's Charles E. Gibbs Leadership Prize

American Association of Nurse Practitioners Fellow

SAN DIEGO (NNS) -- Three Navy researchers received national recognitions this month, demonstrating Naval Health Research Center's (NHRC) quality teamwork and expertise across the spectrum of research and development.

Dr. Rachel Markwald, a sleep research scientist, was awarded the 2014 Sleep Research Society's Young Investigator Award. Cynthia A. LeardMann, a senior epidemiologist, was awarded the Charles E. Gibbs Leadership Prize from the George Washington University, and Capt. Jacqueline Rychnovsky, NHRC's commanding officer, was selected to be a fellow of the American Association of Nurse Practitioners (AANP), the largest professional membership organization for nurse practitioners.

"These awards are indicative of the quality of scientists that we are able to attract here at NHRC," explained NHRC's Director of Research Dr. Karl Van Orden. "This group represents diverse fields ranging from physiology to epidemiology to nursing practice."

Markwald earned the Young Investigator Award for her work in 2013 studying the impact of insufficient sleep on energy expenditure, food intake and weight gain. Her study, published in the Proceedings of the National Academy of Sciences, found a direct impact of insufficient sleep on energy balance.

"These findings have fleet-wide implications since staying fit is a basic

requirement and a necessity for readiness. Service members must often operate under periods of sleep loss while surrounded by quick and easy food options," explained Markwald. "Snacking, especially at night, drove up weight gain in our study. If we are aware that not getting enough food may lead us to eat more than we need, then we can take measures to stop it from happening."

For LeardMann, the editorial board of Women's Health Issues, the academic journal produced by The George Washington University's Jacobs Institute of Women's Health recognized her work in the area of sexual harassment and sexual assault. The Gibbs Leadership Prize is the journal's top honor for the best paper published in 2013.

LeardMann's ultimate goal was to provide information that allowed policy makers to design interventions reducing sexual stressors in deployed environments. Her team found that women who deployed and reported combat experiences were significantly more likely to report sexual harassment or the combination of harassment and assault. An important finding, she noted, with the recent changes to open combat positions to women in the military.

Rounding out the team's top honors, Rychnovsky was selected as a Fellow of the American Association of Nurse Practitioners. The program recognizes contributions to clinical practice, research,

education or policy. Rychnovsky's selection was formalized during a ceremony at the AANP 29th National Conference in Nashville, Tennessee, June 19.

As one of 76 nurse practitioner leaders selected to continue the tradition of influencing national and global health, Rychnovsky was specifically selected for her contributions to public policy and research.

While serving as Senator Daniel K. Inouye (D-HI) Health Policy Fellow, Rychnovsky drafted two pieces of legislation that were successfully integrated into the Patient Protection and Affordable Care Act. She is also the first Navy Nurse Corps Officer to command a Navy Medicine research and development command, while continuing to contribute and advance the field of nursing research.

"We're proud to offer Navy Medicine and the DoD such a diverse and well qualified team of research professionals," noted Van Orden.

As the DoD's premier deployment health research center, NHRC's cutting-edge research and development is used to optimize the operational health and readiness of the nation's armed forces. Within close proximity to more than 95,000 uniformed service members, world-class universities, and industry partners, NHRC's expert team sets the standards in joint ventures, innovation, and practical application.

My Unforgettable Experience from Phnom Penh to Florida

Story courtesy of NAMRU-2 Phnom Penh Public Affairs



NAMRU-2 Phnom Penh Laboratory Technician Say Sinith (center), traveled to Gainesville, Florida to attend the One Health Certificate Program at the University of Florida. (Photo courtesy of NAMRU-Asia Public Affairs)

PHNOM-PENH, Cambodia - Recently, Say Sinith, a laboratory technician from NAMRU-Asia –U.S. Naval Medical Research Unit No. Two Phnom Penh (NAMRU-2 Phnom Penh), had the opportunity to travel to Gainesville, Florida to attend the One Health Certificate Program at the University of Florida.

The primary purpose of the program is to provide One Health training to public health, veterinary health, and environmental health professionals and students who wish to follow such careers. Sinith wrote about the program, and his first time traveling to America.

It was a fantastic and unforgettable experience. The first stop was in the Atlanta airport, in Georgia. The final flight from Atlanta made me feel totally jet lagged.

Arriving in Gainesville I found it is a small city with a large preserved forest

area and a small population. I compared it to the province in the North-West area of Cambodia for the density of the forest.

The One Health program was a collective class with people from many nations. Each day was busy with a variety of instructions and tours. There were interesting tours to a veterinary medicine ward, insect collection building, cattle slaughter, cow producing milk farm, and the modern poultry production. I learned the concept of automation, insect classification, sewage waste management, and disease control.

For instance, infectious disease is separated from other wards and people working in that area were not allowed to enter, contact, or feed animals in the healthy area to prevent spreading disease.

The course helped me understand the One Health concept. There is a correlation between human health to animals and environmental health. It has taught me

how to control and prevent disease outbreak and the importance of team work.

The course revealed to me how important the studies that NAMRU-2 Phnom Penh is conducting are to the Cambodian people's health and the world. It also provided me some knowledge about clinical practices in the labs to enhance my work quality.

After coming back to Cambodia, I plan to pursue my master's degree to develop my capacity and understand more about what are the main health problems in Cambodia and the work needed to deal with these issues.

I do encourage those who wish to apply for this opportunity to try their best. Never stop believing and fighting for your success. I do believe and always remind myself with a proverb said by Frederick Douglass, "Without struggle there is no progress."

Greetings from the NMRC Ombudsman!

The birth of America as a Nation is something to celebrate. Every year on Independence Day, scholars and politicians like to wax poetic on the greatness of our Nation, so I would like to humbly add my own thoughts.

The Declaration of Independence, signed July 4, 1776, signified not just a break from the British monarchy, but a new understanding of the source of government and individual rights.

The ideas of the Founders were themselves revolutionary and the war was the physical embodiment of those ideals; ideals that we still uphold and protect today.

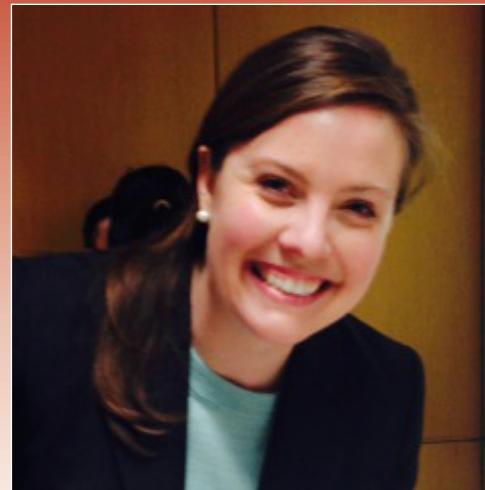
John F. Kennedy, in his 1946 speech said, "Some Elements of the American Character" Independence Day oration to Congress, reminds us those ideals form "a nation's character, [and] like that of an individual, is elusive. It is produced partly by things we have done and partly by what has been done to us... It is well for us to consider our American character, for in peace, as in war, we will survive or fail according to its measure."

Kennedy saw the American character as containing four basic elements of religiosity, idealism, patriotism, and individualism.

These elements are best described in the meditations of Chief Tecumseh of the Shawnee Nation, "So live your life that the fear of death can never enter your heart. Trouble no one about their religion; respect others in their view, and demand that they respect yours... Seek to make your life long and its purpose in the service of your people...Always give a word or sign of salute when meeting or passing a friend, even a stranger, when in a lonely place. Show respect to all people and grovel to none. When you arise in the morning give thanks for the food and for the joy of living. Abuse no one and no thing, for abuse turns the wise ones to fools and robs the spirit of its vision. [And] when it comes your time to die, be not like those whose hearts are filled with the fear of death... [But], sing your death song and die like a hero going home."

Have a Great Navy Day!

Allison



NMRC would like to wish all
Americans
Happy Fourth of July!

A special thank you to the men and women who
have served, risked their lives and continue to
serve in the United States armed forces.

